UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/829,355	04/09/2001	Varadarajan Srinivasan	P191/WLP	1055

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EXAMINER
KIM, HONG CHONG

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	**Applicant(s)**
Office Action Summary	09/829,355	SRINIVASAN ET AL.
	Examiner	**Art Unit**
	Hong C Kim	2186

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>28 April 2003</u> .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-40 and 42-88</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>73-84</u> is/are allowed.

6)☒ Claim(s) <u>1-7,16-22,29-32,36,39,40,42,43,49-51,57-66,69,70,85 and 86</u> is/are rejected.

7)☒ Claim(s) <u>8-15,23-28,33-35,37,38,44-48,52-56,67,68,71,72,87 and 88</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____ .

Detailed Action

1.   Claims 1-40 and 42-88 are presented for examination. This office action is in response to

the amendment filed on 4/28/03. Claims 58-88 have been added and claim 41 has been canceled

by the amendment.

2.   Receipt is acknowledged of information disclosure statement filed on 4/28/03, which the

statement has been placed of record in the file. Information disclosed and listed on PTO 1449

was considered.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

4.   Claims 1-7, 16-22, 58, 29-32, 36, 59, 39-40, 42-43, 49-51, 57, 60-66, 69-70, and 85-86

are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldmeier et al. (Feldmeier) US

Patent No. 6,289,414 in view of Ramankutty US Patent No. 6,502,163.

As to claim 1, Feldmeier discloses a CAM system including an array of binary CAM

cells (col. 8 lines 20+), each cell having a mask for storing a mask pattern indicating priority of

the cells (col. 6 lines 42+, the longest match reads on this limitation, since the longest match has

the most care bits (1's)). Although, Feldmeier discloses a ternary CAM, Feldmeier does not

specifically disclose the array of binary CAM cells segmented into a plurality of array groups,

each array group having a group global mask for storing a mask pattern.

However, Ramankutty discloses the array of binary CAM cells segmented into a plurality

of array groups (Fig. 1 Ref 108-1 to 108-5), each array group having a group global mask for

storing a mask pattern (col. 5 lines 25-30 and col. 10 lines 65+) for the purpose providing

capability of updating data values according to prefix length without having to reorder the entries

in the CAM thereby increasing the system speed.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate the array of binary CAM cells segmented into a plurality

of array groups, each array group having a group global mask for storing a mask pattern of

Ramankutty in the teaching of Feldmeier thereby results in an invention as claimed.

As to claim 2, Feldmeier further discloses wherein two or more array groups have the

same priority (Fig. 3).

As to claim 3, Feldmeier further discloses a CIDR address (col. 6 lines 9+ and col. 9 lines

8-27).

As to claim 4, Feldmeier further discloses an index of the longest prefix (col. 6 lines 9+

and col. 9 lines 8-27).

As to claim 5, Ramankutty further discloses means for storing data in the array groups according to prefix (Fig. 1).

As to claim 6, Feldmeier further discloses means for selectively comparing a search key with data stored in the array groups according to priority (Figs. 3 and 25).

As to claim 7, Ramankutty further discloses means for receiving a priority for the search key and means for comparing the search key with data stored only in the array groups that have the same priority as the search key (col. 5 lines 20-29).

As to claim 16, Ramankutty further discloses means for storing data in the array groups according to prefix (Fig. 1).

As to claim 17, Feldmeier further discloses a next free address (col. 9 lines 25-27).

As to claim 18, Feldmeier further discloses an address decoder (col. 8 lines 43-52).

As to claim 19, Feldmeier further discloses an NFA table (col. 9 lines 25-27).

As to claim 20, Feldmeier and Ramankutty disclose the invention as claimed. Feldmeier

discloses an empty bit (col. 2 lines 53-57).

As to claim 21, Feldmeier further discloses an index circuit to generate a next free

address (col. 9 lines 25-27). Ramankutty further discloses an index circuit (col. 2 lines 52-53).

As to claim 22, Feldmeier and Ramankutty disclose the invention as claimed. Feldmeier

discloses valid bits (col. 2 lines 53-57). Ramankutty further discloses a priority encoder (col. 1

lines 62+).

As to claim 58, Feldmeier and Ramankutty disclose the invention as claimed. Feldmeier

discloses valid bits (col. 2 lines 53-57).

As to claim 29, Feldmeier discloses a CAM system including an array of binary CAM

cells (col. 8 lines 20+), each cell assigned a priority, and a table having a plurality of rows, each

storing the priority of a corresponding cells (Figs. 3, 9, and 24).

Although, Feldmeier discloses a ternary CAM, Feldmeier does not specifically disclose the

array of binary CAM cells segmented into a plurality of array groups, each array group assigned a

priority, and each storing the priority of a corresponding array group.

However, it is well known in the memory art to use the array of binary CAM cells

segmented into a plurality of array groups, each array group assigned a priority, and each storing

the priority of a corresponding array group. For example, Ramankutty discloses the array of

binary CAM cells segmented into a plurality of array groups (Fig. 1 Ref 108-1 to 108-5), each

array group assigned a priority (col. 5 lines 25-30 and col. 10 lines 65+), and each storing the

priority of a corresponding array group (col. 5 lines 25-30 and col. 10 lines 65+) for the purpose

providing capability of updating data values according to prefix length without having to reorder

the entries in the CAM thereby increasing the system speed.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate the array of binary CAM cells segmented into a plurality

of array groups, each array group assigned a priority, and each storing the priority of a

corresponding array group of Ramankutty in the teaching of Feldmeier thereby results in an

invention as claimed.

As to claim 30, Feldmeier further discloses wherein two or more array groups have the

same priority (Fig. 3).

As to claim 31, Ramankutty further discloses each array group includes a group global

register for storing a global mask pattern indicative of the priority of the array group (col. 5 lines

25-30 and col. 10 lines 65+).

As to claim 59, Feldmeier and Ramankutty disclose the invention as claimed. Feldmeier

discloses valid bits (col. 2 lines 53-57).

As to claim 32, Feldmeier further discloses means for selectively storing a search key

with data stored in the array groups according to priority to generate a highest priority match

index (Fig. 5).

As to claim 36, Feldmeier further discloses means for comparing a search key with data

storing the array groups according to priority (Figs. 3, 9, & 25).

As to claim 39, Feldmeier discloses a method of operating a CAM system including an

array of binary CAM cells (col. 8 lines 20+) comprises assigning a priority to each cell, and

selectively storing data in the cell according to priority and storing a mask pattern each cell

having a mask for storing a mask pattern indicating priority of the cells (col. 6 lines 42+, the

longest match reads on this limitation, since the longest match has the most care bits (1's)).

Although, Feldmeier discloses a ternary CAM, Feldmeier does not specifically disclose the array

of binary CAM cells segmented into a plurality of array groups, each array group having a group

global mask for storing a mask pattern.

However, it is well known in the memory art to use the array of binary CAM cells

segmented into a plurality of array groups, each array group assigned a priority, and each array

group having a group global mask for storing a mask pattern. For example, Ramankutty

discloses the array of binary CAM cells segmented into a plurality of array groups (Fig. 1 Ref

108-1 to 108-5), each array group assigned a priority (col. 5 lines 25-30 and col. 10 lines 65+),

and each array group having a group global mask for storing a mask pattern (col. 5 lines 25-30

and col. 10 lines 65+) for the purpose providing capability of updating data values according to

prefix length without having to reorder the entries in the CAM thereby increasing the system

speed. .

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate the array of binary CAM cells segmented into a plurality

of array groups, each array group assigned a priority, and each array group having a group global

mask for storing a mask pattern of Ramankutty in the teaching of Feldmeier thereby results in an

invention as claimed.

As to claim 40, Feldmeier further discloses wherein two or more array groups have the

same priority (Fig. 3).

As to claim 42, Feldmeier further discloses a next free address (col. 9 lines 25-27).

As to claim 43, Feldmeier further discloses generating an NFA for each priority, storing

the NFA, selecting a row of the NFA table using the priority, accessing the NFA (col. 9 lines 25-

27 and Figs. 3, 9, and 24).

As to claim 49, Feldmeier further discloses a CIDR address (col. 6 lines 9+ and col. 9

lines 8-27).

As to claim 50, Feldmeier further discloses an index of the longest prefix (col. 6 lines 9+

and col. 9 lines 8-27).

As to claim 51, Feldmeier further discloses selectively comparing a search key with data

stored in the array groups according to priority (Figs. 3, 4 Ref. 2, and 24).

As to claim 57, Feldmeier further discloses storing the priority for each array group in a

priority table (Figs. 3 and 24).

As to claim 60, Feldmeier discloses a CAM comprising: plurality of CAM array groups

each including a plurality of rows of binary CAM cells (col. 8 lines 20+) and a plurality of mask

circuits each coupled to one of the CAM cell for storing masks for masking one or more bits,

wherein each mask indicates a priority of the corresponding CAM cells relative to other CAM

cells (col. 6 lines 42+, the longest match reads on this limitation, since the longest match has the

most care bits (1's)). Although, Feldmeier discloses a ternary CAM, Feldmeier does not

specifically disclose a plurality of group global mask circuits each coupled to a corresponding

one of the CAM array groups.

Ramankutty discloses a plurality of group global mask circuits (Fig. 1 Ref 108-1 to 108-

5) each coupled to a corresponding one of the CAM array groups (col. 5 lines 25-30 and col. 10

lines 65+) for the purpose providing capability of updating data values according to prefix length

without having to reorder the entries in the CAM thereby increasing the system speed.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate a plurality of group global mask circuits each coupled to a

corresponding one of the CAM array groups of Ramankutty in the teaching of Feldmeier thereby

results in an invention as claimed.

As to claim 61, Feldmeier and Ramankutty disclose the invention as claimed. Feldmeier

further discloses the priority assigned to each CAM array group is unrelated to the CAM array

group's location relative to other CAM array groups (col. 6 lines 42+, the longest match reads on

this limitation, since the longest match has the higher priority).

As to claims 62 and 63, Feldmeier and Ramankutty disclose the invention as claimed.

Feldmeier further discloses valid bits (col. 2 lines 53-57).

As to claim 64, Feldmeier further discloses a CIDR address (col. 6 lines 9+ and col. 9

lines 8-27).

As to claim 65, Feldmeier further discloses an index circuit to generate a next free

address (col. 9 lines 25-27). Ramankutty further discloses an index circuit (col. 2 lines 52-53).

As to claim 66, Ramankutty further discloses a select circuit and a priority encoder (col.

1 lines 62+).

As to claim 69, Feldmeier further discloses an index circuit to generate a next free

address (col. 9 lines 25-27). Ramankutty further discloses an index circuit (col. 2 lines 52-53).

As to claim 70, Ramankutty further discloses a select circuit and a priority encoder (col.

1 lines 62+).

As to claim 85, Feldmeier discloses a CAM comprising: plurality of CAM array groups

each including a plurality of rows of binary CAM cells (col. 8 lines 20+). Although, Feldmeier

discloses a ternary CAM, Feldmeier does not specifically disclose a plurality of group global

mask circuits each coupled to a corresponding one of the CAM array groups and an index circuit.

Ramankutty discloses a plurality of group global mask circuits (Fig. 1 Ref 108-1 to 108-

5) each coupled to a corresponding one of the CAM array groups (col. 5 lines 25-30 and col. 10

lines 65+) and an index circuit (col. 2 lines 52-53) for the purpose providing capability of

updating data values according to prefix length without having to reorder the entries in the CAM

thereby increasing the system speed.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate a plurality of group global mask circuits each coupled to a

corresponding one of the CAM array groups and index circuit of Ramankutty in the teaching of

Feldmeier thereby results in an invention as claimed.

As to claim 86, Ramankutty further discloses a select circuit and a priority encoder (col.

1 lines 62+).

Allowable Subject Matter

5.   Claims 73-84 are allowed.

6.   Claims 8-15, 23-28, 33-35, 37-38, 44-48, 52-56, 67-68, 71-72 and 87-88 are objected to

as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment

7.   Applicant's arguments filed on 4/28/03 have been fully considered but they are not

deemed to be persuasive.

Applicant's remarks that the references not teaching a group global mask is not

considered persuasive.   Ramankutty discloses a group global mask (col. 5 lines 25-30 and col.

10 lines 65+).   Therefore broadly written claims are disclosed by the references cited.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.   See attached PTO-892.

9.   a shortened statutory period for response to this action is set to expire 3 (three) months

and 0 (zero) days from the mail date of this letter.   Failure to respond within the period for

response will result in **ABANDONMENT** of the application (see 35 USC 133, MPEP 710.02,

710.02(b)).

10.   Applicants are requested to number each line of each <u>claim</u> starting with line number one

to provide easier communication in the future.

11.   When responding to the office action, Applicant is advised to clearly point out the

patentable novelty which he or she thinks the claims present in view of the state of the art

disclosed by the references cited or the objections made. He or she must also show how the

amendments avoid such references or objections.   See 37 C.F.R. § 1.111(c).

12.   When responding to the office action, Applicants are advised to provide the examiner

with the line numbers and page numbers in the application and/or references cited to assist

examiner to locate the appropriate paragraphs.

13.   Any inquiry concerning this communication or earlier communications from the

Examiner should be directed to Hong Kim whose telephone number is (703) 305-3835. The

Examiner can normally be reached on the weekdays from 8:30 AM to 5:00 PM.

        If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's

supervisor, Matt Kim, can be reached on (703) 305-3821.

        Any inquiry of a general nature or relating to the status of this application should be

directed to the Group receptionist whose telephone number is (703) 305-3900.

14.   **Any response to this action should be mailed to:**

                Commissioner of Patents and Trademarks
                Washington, D.C. 20231

                or faxed to TC-2100:
                After-final   (703) 746-7238
                Official   (703) 746-7239 (for formal communications intended for
entry)

Non-Official/Draft (703) 746-7240 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

HK
Primary Patent Examiner
July 9, 2003